Enabling wafer growth

Nitride semiconductors have been blazing a trail for some time now, on the basis of their emission of blue LED and laser light and the promise of white-light LED illumination. But so far commercial devices have only been fabricated on lattice-mismatched heteroepitaxial substrates such as sapphire and silicon carbide.

Our Fall-99 MRS meeting report (page 23) details developments in growth methods for GaN which attempt to overcome the stress-induced defects from the lattice mismatch: from Lateral Epitaxial Overgrowth (by both MOCVD and HVPE) to pendeo-epitaxy (where GaN is grown outward from flexible pillars and suspended away from a silicon-based substrate).

Most recently, progress has been made beyond the previous high-pressure growth of single-crystal GaN homoepitaxial substrates. Sumitomo Electric Industries has leapfrogged the previous best of an inch or so in diameter by using a thermodynamic technique (without using high pressure) to grow 2" GaN substrates (see cover), targeting commercial sales for blue lasers by 2001 and, more long term, electronic devices.

As well as the growth of larger GaN substrates perhaps making nitride devices more commercially viable, the GaAs industry is transitioning rapidly from 4" to 6" wafers, driven in particular by the boom in telecoms. On page 42, Part 1 of an article on epi-wafer processing focuses on MBE, and how the industry is gearing up for higher-volume and more cost-effective manufacturing with multi-wafer 6" systems from Riber, VG Semicon and EPI MBE (Part 2 in the next issue will cover MOCVD).

One strategy is to migrate capacity in stages from 4" to 6" wafer processing. In contrast, a bolder strategy is that of Filtronic Compound Semiconductor, profiled on page 38. To take advantage of an existing, ex-silicon high-volume facility and highly automated equipment, Filtronic is starting the fab up using 6" GaAs wafers (installing EPI MBE's new "silicon-like" cluster tool), and aims to quickly fill a gap in a market where demand is outstripping supply.

Manufacturers are therefore rushing to install equipment. However, as with GaN developments, commercial viability of device technology is fundamentally dependent on the quality and quantity of the materials supply, so it is vitally important that wafer suppliers like Freiberger (see news pages) can invest in development and manufacturing capacity for larger wafers.

Mark Telford

Mark Telford, Editor

III-Vs Review — Covering advanced semiconductors worldwide
http://www.elsevier.com/locate/iiivsrev

Editor: Mark Telford
Tel: +44 (0)1865 843639 Fax: +44 (0)1865 843971 E-mail: m.telford@elsevier.co.uk

Associate Editor: Roy Szweda
E-mail: r.szweda@dial.pipex.com

North American Consulting Editor: Ruth DeJule

Publishing Manager: Mark Purvis

Advertising Sales Manager: Darren Cummings
Tel: +44 (0)1865 843829. Fax: +44 (0)1865 843973 E-mail: d.cummings@elsevier.co.uk

Reprints: Chloe Turner
Tel: 44 (0) 1865 843846, Fax: 44 (0) 1865 843973, E-mail: c.turner@elsevier.co.uk

Marketing: Emma Welsh Tel: +44 (0)1865 843825

Published six times a year
Elsevier Advanced Technology, The Boulevard, Langford Lane, Kidlington, Oxford, OX5 1AS, UK.

SubscripFtion enquiries, orders and payments:
For customers residing in the Americas (North, South and Central America)
Elsevier Science, Customer Support Department, PO Box 945,New York NY 10010, USA
Tel: +1 212 633-3730 [Toll Free number for North American customers: 1-800-4ES-INFO (437-4636)] Fax: +1 212-633-3680, E-mail: usinfo-f@elsevier.com

For customers in the Rest of the World:
Elsevier Science, Customer Support Dept.
PO Box 211, 1000 AE Amsterdam, The Netherlands
Tel: +31 20-4853757 Fax: +31 20-4853432 E-mail: nlinfo-f@elsevier.nl

Subscriptions: Annual subscription (six issues) NLG453/US$230/£147/€205.56. Price valid to end of 2000 and includes airmail delivery in Europe and airspeeded delivery elsewhere.

A member of the Reed Elsevier plc group

Periodicals postage paid at Rahway, NJ. III-V's Review is published six times a year. Postmaster send all address corrections to III-V's Review, c/o Elsevier Science Regional Sales Office, Customer Support Department, 655 Avenue of the Americas, New York, NY 10010.

The opinions expressed by individuals in this publication are not necessarily those of Elsevier, who shall not be held responsible for them. All trademarks acknowledged.

Printed by: Friary Press Ltd. Journal Number: 02076 ISSN 0961-1290